EXHIBIT 20

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HONORABLE JAMES L. ROBART

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

MICROSOFT CORPORATION,

Plaintiff,

v.

MOTOROLA, INC., MOTOROLA MOBILITY LLC. and GENERAL INSTRUMENT CORPORATION,

Defendants.

CIVIL ACTION FILE

No. C10-1823-JLR

SUPPLEMENTAL EXPERT REBUTTAL REPORT OF TIMOTHY DRABIK

September 20, 2012

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TIMOTHY DRABIK REPORT

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I. INTRODUCTION

1. My name is Timothy Drabik. I submitted a report in this action, Microsoft Corp. v. Motorola, Inc., Case No. 2:10-cv-1823 JLR, on July 24, 2012 ("July 24 Report"). I also submitted an expert rebuttal report in this action on August 10, 2012 ("August 10 Report"). This report supplements my August 10 Report, and in particular responds to various conclusions set forth in the August 10, 2012 Rebuttal Report of Michael T. Orchard (the "Orchard Rebuttal Report").

2. For this Report, in addition to the materials previously referred to in my July 24 and August 10 Reports, I have reviewed the Orchard Rebuttal Report and the documents, patents and references cited therein.

3. The opinions expressed herein are my own and are based on my analysis in this matter and on the education, experience, training, and skill I have accumulated in the course of my 30 year career in technologies, systems, and signal processing for information processing and display.

4. The information on which I have based my opinions is of the type reasonably relied on by experts in the field of video processing in forming opinions or inferences on the subject of patent infringement. Between now and such a time that I may be asked to testify in this case, I expect to continue my review, evaluation, and analysis of information generated during discovery.

II. THE VALUE OF MMI'S CONTRIBUTION TO THE H.264 STANDARD

A. Motorola's Adaptive Frame/Field Coding Patents Are Directed To Core Features Of H.264

5. I disagree with Prof. Orchard's conclusions regarding adaptive frame/field coding at ¶¶ 26-31 of his Rebuttal Report insofar as they suggest that adaptive frame/field coding is not a core feature of H.264. Adaptive frame/field coding is integral to the H.264 Standard. It is

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integral to the features that Prof. Orchard identifies in paragraph 26—"prediction," "transform," and "quantization." For example, many of Motorola's MBAFF and PAFF patents are explicitly directed to the important feature of prediction in the adaptive frame/field coding context. [*See, e.g.,* U.S. Patent No. 6,980,596 ("the '596 Patent") at col. 7, ln. 32 – col. 8, ln. 6 (describing coding of macroblock pairs in frame mode and field mode), col. 7, ln. 56-59 (smaller blocks for use in temporal prediction with motion compensation), col. 9, ln. 22 – col. 12, ln. 61 (inter prediction); col. 14, ln. 44 – col. 17, ln. 9 (intra prediction), col. 12,ln. 62 – col. 13, ln. 25 (macroblock skipping); U.S. Patent No. 7,769,087 ("the '087 Patent") at col. 5, lns. 37-47 (bi-predicted pictures)]. As Prof. Orchard acknowledged, "H.264 achieved much of its compression gains through carefully designed motion compensation and prediction that improve motion compensated prediction accuracy, while controlling the motion information that needs to be transmitted." [Orchard Opening Report at p. 31] Motorola's MBAFF and PAFF patents are directed to such "carefully designed motion compensation and prediction" techniques.

6. Prof. Orchard's cited excerpt from my claim construction tutorial [Orchard Rebuttal Report at ¶ 30] is consistent with my opinion that adaptive frame/field coding is a core feature. In the excerpted slide, I was discussing a block diagram of a prior art encoder in order to lay the groundwork for explaining the inventive contributions of Motorola's '374, '375, and '376 Patents. In the same tutorial, I went on to explain how those patents are directed to intra prediction, inter prediction, and horizontal & vertical scanning in an MBAFF context.

7. Finally, H.264 video coding experts, including Microsoft's Gary Sullivan, recognize adaptive frame/field coding as one of the main innovative features of the video coding layer. [Marpe et al., The H.264/MPEG4 Advanced Video Coding Standard and its Applications, IEEE Communications Magazine, August 2006 ("Marpe"), at 136-37 (MOTM_WASH1823_0394430-431)].

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8. I also disagree with Prof. Orchard's conclusions regarding adaptive frame/field coding at ¶¶ 32-35 of his Rebuttal Report insofar as they suggest that adaptive frame/field coding is not essential to H.264. Prof. Orchard mischaracterizes and distorts the statements made in my July 24 Report. My opinion that adaptive frame/field coding techniques are essential to the H.264 Standard [July 24 Report at ¶ 52] is based on the fact that adaptive frame/field coding must be implemented at the Main and High Profiles, Levels 2.1 to 4.1 in compliant H.264 decoders. [August 10 Report at ¶ 76-77] It is undisputed that AFF coding is essential to these Profiles/Levels. [Orchard Opening Report at p. 231 ("... a decoder that conforms to those levels of the Main and High profiles must have the capability to decode H.264 video that uses MBAFF ...")] This is in contrast to tools described in a number of the Annexes of the H.264 Standard. In my July 24 Report, I explained that these tools were ancillary (*i.e.*, a conforming decoder need not use such tools) and were the subject of many of Microsoft's patents. [July 24 Report at ¶¶ 61-67]

9. I further disagree with Prof. Orchard's statement that "Interlaced coding tools are not essential to H.264 decoding." [Orchard Rebuttal Report at ¶ 40] As I explained in my August 10 Report, decoders that support Levels 2.1 to 4.1 of the Main Profile or High Profile must be capable of decoding a bitstream that has been encoded with such tools. [August 10 Report at ¶ 77] Therefore, Motorola's H.264 essential patents that are directed to MBAFF, PAFF, field scan, and motion compensation involving three neighboring blocks are essential to H.264. [July 24 Report at ¶¶ 123, 141, 181, 193, 197, 201, 205, 209, 214, 218, 232, 240, 249]

III. THE VALUE OF MMI'S PATENTS TO H.264

A. U.S. Patent No. 5,235,419 ("the '419 Patent"): The Krause Family

10. I disagree with Prof. Orchard conclusions that U.S. Patent No. 5,144,423 ("the '423 Patent") and the Sullivan thesis, "meet each and every element" of claim 20 of the Krause '419 patent. [Orchard Rebuttal at ¶¶ 8, 93-109]

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1. The '423 Patent

11. The '423 Patent does not disclose, for example, Krause '419 claim 20, element 1: "means for receiving blocks of encoded video data, provided by different motion compensators depending on which motion compensator meets a selection criteria for a particular region of a video image defined by each block." The claim language requires that the received blocks be provided by ***different*** motion compensators depending on which motion compensator meets a selection criteria. In contrast, the '423 Patent discloses coding a 32×16 region using one motion vector for the entire 32×16 block ***and***, if enough bits are available in the "bit budget," coding each 8×8 block within that 32×16 block with its own unique motion vector. ['423 Patent at col. 10, lns. 50-62] As a result, the '423 Patent does not disclose a means for receiving blocks provided by different motion compensators depending on which one meets a "selection criteria." Instead, it discloses the use of both motion compensators based, not on a comparison of the motion compensators, but rather on whether enough bits remain available in a "bit budget" to include the motion vectors for the 8×8 blocks. Thus, Prof. Orchard's statement that the '423 Patent "provides motion vectors for either 32×16 blocks or for 8×8 blocks" [Orchard Rebuttal Report at ¶ 96] is incorrect because the '423 Patent provides motion vectors not for one or the other, but for ***both*** block sizes when possible. Likewise, Prof. Orchard is incorrect that the '423 Patent discloses that "the encoder selects between these two types of motion compensators." [*Id.*]

12. For the same reason, the '423 Patent does not disclose Krause '419 claim 20, element 4: "means responsive to said motion vector and common to data blocks provided by any of said different motion compensators for recovering current video image data from data provided by a current data block and at least one prior data block." Prof. Orchard's statement that "motion compensator block 207 is common to data blocks provided by either of the motion compensators" is incorrect because the '423 Patent discloses that each data block is encoded

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using both motion compensators, not using one or the other motion compensator. Therefore, the "means responsive" receives the data blocks provided not by "any of said different motion compensators" but by both of said motion compensators.

13. In addition, as discussed in my Rebuttal Report, the '423 Patent does not disclose Krause '419 claim 20, element 3: "means responsive to said code word for recovering a motion vector for each block from motion vector data received with the block." [August 10 Report at ¶ 236]

14. As an alternative to the Krause '419 Patent, the '423 Patent would provide worse performance because, instead of encoding the block with only one motion compensator that meets a selection criteria, the '423 Patent discloses encoding the 32×16 blocks with multiple motion compensators, such that motion vectors are sent for both a 32×16 block and for the 8×8 blocks that comprise the 32×16 block. By sending multiple motion vectors for the same image region, the technique described in the '423 Patent is less efficient (*i.e.*, requires more bits) than the invention in the Krause '419 Patent.

2. The Sullivan Thesis

15. As an initial matter, Prof. Orchard has not demonstrated that the Sullivan Thesis was publicly available.

16. Even if the thesis was publicly available, I disagree that it discloses all elements of claim 20 of the Krause '419 Patent. For example, the thesis fails to disclose Krause '419 claim 20, element 2: "means coupled to said receiving means for retrieving, from each received data block, a code work (*sic*) representative of a motion compensator from which the block is received." It does not describe any means for retrieving a code word that represents the motion compensator used. [August 10 Report at ¶ 237] For example, Figure 3.2 does not disclose a means for retrieving a code word.

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17. As an alternative to the Krause '419 Patent, the Sullivan thesis would provide worse performance because, for example, it is limited to square block sizes (*e.g.*, 16×16, 8×8, 4×4, 2×2). [*See* Sullivan thesis, p. 72 ("Figure 3.11 illustrates the quadtree data structure, which decomposes a $2^N \times 2^N$ image block into an $(N - n_0 + 1)$-level hierarchy of square blocks, where all blocks at level n have size $2^n \times 2^n$, $0 \le n_0 \le n \le N$.")] These block sizes are grouped together with like-sized blocks as depicted in Figure 3.11(a), shown as Figure 1 below. As a result, the method described by the Sullivan thesis requires coding additional motion vectors in areas where groups of 2×2, 4×4, or 8×8 blocks are used but not necessary. Krause '419 is not limited in this way. As can be seen in Figure 3.11(a), there are regions of the picture that do not contain motion requiring division of the picture into the smaller block sizes. For example, the bottom half of the macroblock in Figure 3.11(a) can be represented by a 16×8 block using the Krause '419 invention. But the Sullivan thesis divides that 16×8 block into two 8×8 blocks, which results in the use of additional bits. By requiring additional unnecessary bits to code the image, the disclosure in the Sullivan thesis is less efficient than the invention in Krause '419.

(a)

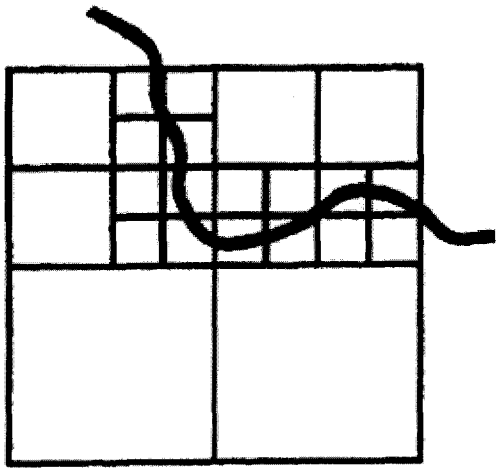

Figure 1. Figure 3.11(a) from Sullivan thesis.

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3. "Means plus function" claim elements

18. I disagree with Prof. Orchard's conclusion that, "[t]he Krause patent does not disclose any software" and therefore "does not include Microsoft's software within its scope." [Orchard Rebuttal Report at ¶¶ 110-11] The Krause '419 Patent at multiple places describes structures that a person of ordinary skill in the art would understand can be implemented using software or hardware. For example, FIGs. 5 and 6 of the Krause '419 Patent are block diagrams of a decoder implementing the invention of the patent. In my opinion, a person of ordinary skill in the art would understand from reading the specification that these block diagrams could be implemented in hardware or in software. Also, the Krause '419 Patent describes the use of algorithms in multiple places. [*See, e.g.*, '419 Patent at col. 2, ln. 60, col. 6, ln. 43, col. 9, ln. 22] In my opinion, a person of ordinary skill in the art reading the patent specification would understand from the specification that the structures disclosed in the '419 Patent for performing the functions set forth in the means-plus-function claim elements include software implementations.

19. The prior art cited on the face of the Krause '419 Patent confirms my opinion that those of ordinary skill in the art would understand from the specification that components of encoders and decoders could be implemented in both hardware and software. [*See e.g.*, U.S. Patent No. 5,068,724 (to Krause et al.) at col. 7, lns. 1-4 (explaining that the functions of a bit count comparator "can be implemented in software using techniques well known in the art"); U.S. Patent No. 5,091,782 (to Krause et al.) at col. 8, lns. 37-38 (explaining that error evaluation and selection components can be implemented in hardware or software)]

B. U.S. Patent 5,376,968 ("the '968 Patent"): The Wu Family

20. I disagree with Prof. Orchard's conclusions that the November 1988 H.261 standard, U.S. Patent No. 5,227,878 ("the Puri Patent"), and Annex L.12 of ISO/IEC document AVC-356 ("the test model") "meets all elements of claim 19" of the Wu '968 Patent. [Orchard Rebuttal Report at ¶¶ 8, 115-143] In my opinion, none of these references invalidates claim 19.

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1. The November 1998 H.261 Standard

21. The November 1988 H.261 standard does not disclose a "whole received superblock," and therefore does not disclose any of the elements of claim 19 of Wu '968. I disagree with Prof. Orchard's conclusion that "[o]ne can group four 8×8 blocks and view them as a 'superblock.'" [Orchard Rebuttal Report at ¶ 117] H.261 discloses no such grouping. Moreover, one having ordinary skill in the art would not read H.261 to teach this.

22. As an alternative to the Wu '968 Patent, H.261 would provide worse performance because, instead of multiple block sizes, H.261 used only 8×8 blocks. One having skill in the art understands the advantage of having multiple block sizes. Depending on the amount of motion in the image to be coded, different block sizes allow for more efficient coding. It is preferable to have larger block sizes when there is less motion and smaller block sizes when there is more motion. The Wu '968 Patent describes the shortfalls of the prior art methods. ['968 Patent at col. 7, lns. 3-22, col. 2, lns. 34-49; *see also* Wu German Opinion, p. 29 (MOTM_WASH1823_0602088)]

2. The Puri Patent

23. As I explained in my August 10 Report, the Puri Patent does not disclose any of the claimed elements of claim 19 of the Wu '968 Patent. [August 10 Report at ¶ 255] With regard to Prof. Orchard's element-by-element analysis, for example, he fails to demonstrate the presence of a "third overhead data indicating that the individual blocks contained in the received superblock were compressed using a plurality of different compression modes." This element is not present in the Puri Patent because col. 28 and Table 1 of that patent fail to provide any way of distinguishing between the "macroblock_type" codes for the various picture types (*i.e.*, I-pictures, P-pictures, B-pictures). As can be seen in Table 1 of the Puri Patent, the "macroblock_type" signal for the P-pictures is in some cases identical to the signal for B-

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pictures. Thus, the overhead data that Prof. Orchard cites does not indicate the compression mode for the individual blocks.

24. As an alternative to the Wu '968 Patent, the Puri Patent would provide worse performance because it is directed to older video coding methods adopted in MPEG-2. [*See* Orchard Opening Report at p. 204] For example, it is limited to performing motion compensation on large block sizes, *i.e.*, 16×16 and 16×8. [*See* Puri Patent at col. 10, ln. 40 – col. 12, ln. 9] This limitation hinders the invention of the Puri Patent when the video comprises complex motion. [*See* '968 Patent at col. 7, lns. 13-15 ("where complex movements from one frame to the next cannot be accurately modeled as a simple translation, a small block size may perform better")] The invention of the '968 Patent performs motion compensation on smaller block sizes that are preferred when there is more motion. [*See, e.g.*, '968 Patent at col. 7, lns. 15-22, col. 10, lns. 45-51]

3. Annex L.12 of ISO/IEC AVC-356

25. I disagree with Prof. Orchard's conclusion that this publication is prior art under 102(e). [Orchard Rebuttal Report at ¶ 147] I understand that 102(e) relates to patents, not publications. Prof. Orchard has not established that the test model is prior art under 102(e), or any other subpart of 35 U.S.C. § 102.

26. Even if Annex L.12 of AVC-356 is prior art, I disagree with Prof. Orchard's conclusion that it discloses each and every element of claim 19. Prof. Orchard cites to intra coding of 8×8 blocks for the "first compression mode," to inter coding of 8×8 blocks for the "second compression mode," and to adaptive intra/inter coding of 8×8 blocks for the third compression mode. However, the claim 19 requires that the first and second compression modes are "used to compress the whole received superblock." The test model does not disclose intra coding or inter coding a "whole received superblock" (*i.e.*, 16×16 macroblock), only 8×8 blocks.

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[*See, e.g.*, '968 Patent, col. 7, lns. 53-62] Finally, Prof. Orchard provides no evidence that this reference was publicly available before the priority data of the claims of the Wu '968 Patent.

27. As an alternative to the Wu '968 Patent, Annex L.12 would provide worse performance because just like H.261, instead of multiple block sizes, Annex L.12 used only 8×8 blocks. As a result, its performance was inadequate when compared to Wu '968 in the same way that H.261 was. [*supra* ¶ 29]

4. "Means plus function" claim elements

28. I disagree with Prof. Orchard's conclusion that "[t]he Wu patent does not disclose using any software for performing the functions recited in claim 19" and therefore "does not include within its scope Microsoft's software." [Orchard Rebuttal Report at ¶¶ 147-49] As an initial matter, Prof. Orchard ignores that the Wu '968 Patent includes method claim 16 to which I understand his arguments do not apply because it does not include any "means" language. This claim would read, for example, on the H.264 encoder in Windows 7. [http://msdn.microsoft.com/en-us/library/windows/desktop/dd797816(v=vs.85).aspx (MOTM_WASH1823_0420071-079)]

29. In addition, the Wu '968 Patent at multiple places describes structures that a person of ordinary skill in the art would understand can be implemented using software. For example, FIGs. 5 and 6 of the Wu '968 Patent are block diagrams of a decoder implementing the invention of the patent. In my opinion, a person of ordinary skill in the art reading the specification would understand that these block diagrams could be implemented in software. Also, the Wu '968 Patent describes the use of algorithms in multiple places. [*See, e.g.*, '968 Patent at col. 7, ln. 4, col. 11, ln. 2] In my opinion, a person of ordinary skill in the art reading the patent specification would understand that the structures disclosed in the Wu '968 Patent for performing the functions set forth in the means-plus-function claim elements include software implementations.

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30. The prior art cited on the face of the Wu '968 Patent confirms my opinion that a person of ordinary skill in the art would understand from the specification that components of the encoders and decoders could be implemented in both hardware and software. [*See e.g.*, U.S. Patent No. 5,068,724 (to Krause et al.) at col. 7, lns. 1-4 (explaining that the functions of a bit count comparator "can be implemented in software using techniques well known in the art"); U.S. Patent No. 5,091,782 (to Krause et al.) at col. 8, lns. 37-38 (explaining that error evaluation and selection components can be implemented in hardware or software)]

C. The "MBAFF" Patent Family

31. I disagree with Prof. Orchard's conclusions that Symes, MPEG-1 and Haskell *et al.* are prior art references applicable to the MBAFF family. [Orchard Rebuttal Report at ¶¶ 161, 162, 164, 165, 168-170] Using MBAFF in combination with the various features claimed in the MBAFF family patents required more than simply taking the techniques used in the prior art and combining them with MBAFF. Prior art techniques named by Prof. Orchard, such as inter coding, were not designed for use with macroblock pairs. Significant work was required to modify these techniques to account for new possibilities introduced by the use of pairs, including keeping track of whether the current macroblock is the top or bottom macroblock of a pair, whether neighboring macroblocks—as opposed to 16×8 sub-blocks—are frame or field coded, and more. Each of the patents' specifications provides additional support for my opinion.

32. U.S. Patent No. 7,310,374 ("the '374 Patent") is directed towards using MBAFF[1] in inter coding mode. [July 24 Report at ¶ 192] The specification of the '374 Patent discloses how the MBAFF technique is performed in inter coding mode at col. 9, ln. 16 — col. 12, ln. 56 and FIGs 12-13. I disagree with Prof. Orchard's statement that "MMI did not invent inter-coding" to the extent that it suggests that Motorola did not invent MBAFF in connection with

[1] Prof. Orchard refers to "prior art MBAFF" and "MMI's version of MBAFF." In all cases that I refer to MBAFF, I am referring to the macroblock pair concept invented by Motorola. I refer to the prior art techniques as single macroblock AFF.

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inter coding mode. [Orchard Rebuttal Report at ¶ 161] Prof. Orchard suggests that this technique was disclosed in MPEG-1 and Symes. [*Id.*] Neither MPEG-1 nor Symes teaches how to perform inter coding mode with MBAFF.

33. U.S. Patent No. 7,310,375 ("the '375 Patent") is directed towards using MBAFF in intra coding mode. [July 24 Report at ¶ 196] The specification of the '375 Patent discloses how the MBAFF technique is performed in intra coding mode at col. 14, ln. 41 — col. 16, ln. 67 and FIGs. 14-17. I disagree with Prof. Orchard's statement that "MMI did not invent intra-coding" to the extent that it suggests that Motorola did not invent MBAFF in connection with intra coding mode. [Orchard Rebuttal Report at ¶ 162] Prof. Orchard suggests that this technique was disclosed in MPEG-1 or VCEG-N54. [*Id.*] MPEG-1 does not teach how to perform intra coding mode with MBAFF. And VCEG-N54 does not teach adaptive frame/field coding of any kind.

34. U.S. Patent No. 7,310,376 ("the '376 Patent") is directed towards using MBAFF with a horizontal or vertical scanning path. [July 24 Report at ¶ 200] The specification of the '376 Patent discloses how the MBAFF technique is performed with a horizontal or vertical scanning path at col. 8, lns. 3-20 and FIG. 9. I disagree with Prof. Orchard's statement that "MMI did not invent scanning macroblocks either horizontally or vertically" to the extent that it suggests that Motorola did not invent MBAFF with a horizontal or vertical scanning path. [Orchard Rebuttal Report at ¶ 164] Using hindsight, Prof. Orchard claims that "Logic, of course, dictates that prior coding standard (*sic*) had to scan macroblocks in some order as well, and horizontal or vertical were logical choices." [*Id.*] But Prof. Orchard provides no example of a coding standard that used vertical scanning. Prof. Orchard suggests that MBAFF with a horizontal scan order was disclosed in MPEG-1 and Symes. [*Id.*] Neither MPEG-1 nor Symes teaches how to perform MBAFF with a horizontal or vertical scanning path.

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35. U.S. Patent No. 7,310,377 ("the '377 Patent") is directed towards using MBAFF where at least one macroblock pair is encoded in intra coding mode and at least one macroblock pair is encoded in inter coding mode. [July 24 Report at ¶ 204] The specification of the '377 Patent discloses how the MBAFF technique is performed where at least one macroblock pair is encoded in intra coding mode and at least one macroblock pair is encoded in inter coding mode at col. 9, ln. 11 — col. 16, ln. 61. I disagree with Prof. Orchard's statement that "MMI did not invent the idea of pictures in which some portions are inter-coded and other portions are intra-coded" to the extent that it suggests that Motorola did not invent MBAFF where at least one macroblock pair is encoded in intra coding mode and at least one macroblock pair is encoded in inter coding mode. [Orchard Rebuttal Report at ¶ 165] Prof. Orchard suggests that this technique was disclosed in MPEG-2 and Symes. [*Id.*] Neither MPEG-2 nor Symes teaches how to perform MBAFF where at least one pair is encoded in intra coding mode and at least one macroblock pair is encoded in inter coding mode.

36. U.S. Patent No. 7,477,690 ("the '690 Patent") is directed towards using MBAFF where at least one macroblock in the macroblock pair is skipped during encoding. [July 24 Report at ¶ 212] The specification of the '690 Patent discloses how the MBAFF technique is performed with skipped macroblocks at col. 12, lns. 38-58 and col. 13, ln. 58 — col. 14, ln. 13. I disagree with Prof. Orchard's statement that "MMI did not invent or contribute skipped macroblocks" to the extent that it suggests that Motorola did not invent MBAFF with skipped macroblocks. [Orchard Rebuttal Report at ¶ 168] Prof. Orchard suggests that this technique was disclosed in MPEG-2 and Haskell *et al.* [*Id.*] Neither MPEG-2 nor Haskell *et al.* teaches how to perform macroblock skipping with MBAFF.

37. U.S. Patent No. 7,817,718 ("the '718 Patent") is directed towards using MBAFF where at least two motion vectors are derived for at least one block in a bi-predicted picture. [July 24 Report at ¶ 217] The specification of the '718 Patent discloses how the MBAFF

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technique is performed with derived motion vectors for blocks of bi-predicted pictures at col. 12, ln. 56 — col. 13, ln. 47. I disagree with Prof. Orchard's statement that "MMI did not invent bi-predicted pictures" to the extent that it suggests that Motorola did not invent MBAFF with derived motion vectors for blocks of bi-predicted pictures. [Orchard Rebuttal Report at ¶ 169] Prof. Orchard suggests that this technique was disclosed in MPEG-2 and Haskell *et al.* [*Id.*] Neither MPEG-2 nor Haskell *et al*. teaches how to perform macroblock skipping with MBAFF.

D. U.S. Patent 6,005,980 ("the '980 Patent"): The Eifrig Family

38. I disagree with Prof. Orchard's conclusion that "[a]n alternative approach [to the '980 Patent] might include swapping one of the neighboring blocks with a different block.... Such a switch likely would not introduce a significant performance impact." [Orchard Rebuttal Report at ¶¶ 7, 195] In my opinion, the alternative identified by Prof. Orchard would result in worse performance than the '980 Patent. The H.264 Standard uses the top-left neighbor only when the top-right neighbor is unavailable. [H.264 Standard at 162 (8.4.1.3.2)] If the members of the JVT believed that the top-left neighbor was as good as the top-right, they would have allowed for use of the top-left neighbor in all circumstances. However, they did not. In addition, Dr. Ajay Luthra testified that the use of the top-right neighbor provides better diversity, which results in a more accurate predictor:

> Q. Is there an advantage to using neighboring blocks A, B, C as opposed to neighboring blocks A, B, D?
>
> A. Yes. If you -- if you note it, if you only use A, B, D, then you have information that is skewed towards top left of the -- what is known as current MB. So you get inferior information. If you include A, B and C, then C provides the information about the right side of the -- of the current MB.
>
> So A, B and C provides you a more wholesome information about what is happening in the neighborhood of current macroblock. So that's why generally A, B, C is considered to be a better neighborhood to use as opposed to only A, B and D.
>
> [Luthra Depo. Tr., 139:17-140:4]

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E. Windows 7 & 8 H.264 Encoder and Decoder

39. I disagree with Prof. Orchard's argument that Windows 7 and 8 do not infringe if they are installed on a computer with graphics hardware that allows the Windows 7 H.264 decoder to use the DXVA API to offload some decoding steps to the computer's hardware. [Orchard Rebuttal Report at ¶¶ 113, 150; *see also* ¶¶ 245] As an initial matter, such graphics hardware is not available on all computers. [Orchard Tr., 31:14-19] Even on computers with such graphics hardware, the Windows 7 and 8 H.264 decoder software remains capable of performing the steps of H.264 decoding and does so in certain well-documented circumstances.

40. In any event, the question of whether software executes on a CPU or GPU is irrelevant. All software runs on hardware of some sort. Even when the Windows 7 and 8 H.264 decoder uses DXVA to execute on graphics hardware, the Windows 7 and 8 H.264 decoder software controls how that hardware is used and what is done with its output. Specifically, the Windows 7 and 8 H.264 decoder software calls those DXVA functions, and those functions return their results to the Windows 7 and 8 H.264 decoder software. [Orchard Tr., 32:13-19; *see also* Gary J. Sullivan, DirectX Video Acceleration Specification for H.264/AVC Decoding, at 10, Microsoft Corporation (2010) (describing the calls made by a software decoder that initiate and specify the decoding operations performed by the graphics hardware accelerators) (MS-MOTO_1823_00005240596)]

41. I disagree with Prof. Orchard's statement that "application developers will prefer that the hardware, not the operating system software, perform decoding operations." [Orchard Rebuttal Report at ¶ 245] While hardware implementations may, in some circumstances, be faster, they may also return different results. In contrast, if an application uses the Windows 7 H.264 decoder, the application developer will get the same results on any Windows platform.

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Therefore, application developers that value consistency over speed may <u>not</u> prefer that the hardware perform decoding operations.

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